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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: :
Domer et al. :
Serial No.: 10/056,826 :
Filed: January 25, 2002 :
For: Voice Activity Detector for Telephone

Examining Group:
Examiner:
Date: August 27, 2003

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PRELIMINARY AMENDMENT

Hon. Commissioner for Patents
Alexandria, Virginia 22313

SIR:

Prior to the first Office Action, kindly amend the above-identified application as follows.

AMENDMENTS TO SPECIFICATION (description)

Page 5, please amend the paragraph beginning on line 19 as follows.

FIG. 8 is a block diagram of a telephone constructed in accordance with a preferred embodiment of the invention; [[and]]

Page 5, please amend the paragraph beginning on line 21 as follows.

FIG. 9 is a chart illustrating a portion of the operation of the telephone illustrated in FIG. 8; [[.]]

Page 5, please add the following new paragraphs between lines 22 and 23.

FIG. 10 is a perspective view of a conference phone or a speaker phone;

FIG. 11 is a perspective view of a hands free kit;

FIG. 12 is a perspective view of a cellular telephone;

FIG. 13 is a perspective view of a desk telephone;

FIG. 14 is a perspective view of a cordless telephone; and

FIG. 15 is a block diagram of a cellular telephone;

Page 14, please add the following new paragraphs between lines 5 and 6.

The word "telephone" corresponds to several devices having essentially the same electronics but differing in external appearance. FIG. 10 illustrates a conference telephone or speaker phone such as found in business offices. Telephone 120 includes microphone 121 and speaker 122 in a sculpted case. Telephone 120 may include several microphones, such as microphones 124 and 125 to improve voice reception or to provide several inputs for echo rejection or noise rejection, as disclosed in U.S. Patent 5,138,651 (Sudo).

FIG. 11 illustrates what is known as a hands free kit for providing audio coupling to a cellular telephone, illustrated in FIG. 12. Hands free kits come in a variety of implementations but generally include powered speaker 131 attached to plug 132, which fits an accessory outlet or a cigarette lighter socket in a vehicle. A hands free kit also includes cable 133 terminating in plug 134. Plug 134 fits the headset socket on a cellular telephone, such as socket 137 (FIG. 12) in cellular telephone 138. Some kits use RF signals, like a cordless phone, to couple to a

telephone. A hands free kit also typically includes a volume control and some control switches, e.g. for going "off hook" to answer a call. A hands free kit typically includes a lapel microphone (not shown) that plugs into the kit. Audio processing circuitry constructed in accordance with the invention can be included in a hands free kit, such as illustrated in FIG. 11, or in a cellular telephone, such as illustrated in FIG. 12.

FIG. 13 illustrates a desk telephone including base 140, keypad 141, display 143 and handset 134. As illustrated in FIG. 13, the telephone has speaker phone capability including speaker 135 and microphone 146. The cordless telephone illustrated in FIG. 14 is similar except that base 150 and handset 151 are coupled by radio frequency signals, instead of a cord, through antennas 153 and 154. Power for handset 151 is supplied by internal batteries (not shown) charged through terminals 156 and 157 in base 150 when the handset rests in cradle 159.

As noted above, these different forms of telephone can serve as conference telephones and benefit from the noise reduction provided by the invention. FIG. 15 is a block diagram of the major components of a cellular telephone. Typically, the blocks correspond to integrated circuits implementing the indicated function. Microphone 161, speaker 162, and keypad 163 are coupled to signal processing circuit 164. Circuit 164 performs a plurality of functions and is known by several names in the art, differing by manufacturer. For example, Infineon calls circuit 164 a "single chip baseband IC." Qualcomm calls circuit 164 a "mobile station modem." The circuits from different manufacturers obviously differ in detail but, in general, the indicated functions are included.

A cellular telephone includes both audio frequency and radio frequency circuits. Duplexer 165 couples antenna 166 to receive processor 167. Duplexer 165 couples antenna 166 to power amplifier 168 and isolates receive processor 167 from the power amplifier during transmission. Transmit processor 169 modulates a radio frequency signal with an audio signal from circuit 164. In non-cellular applications, such as speakerphones, there are no radio frequency circuits and signal processor 164 may be simplified somewhat. Problems of echo cancellation and noise remain and are handled in audio processor 170. It is audio processor 170 that is modified to include the invention. The details of audio processor 170 are illustrated in FIG. 8.